January 25, 1963

Dr. J. H. U. Brown
Chief, Special Research
Resources Branch
Division of Research Facilities
and Resources
National Institutes of Health
Bethesda 14, Maryland

Dear Dr. Brown:

Dr. Keith Killam has suggested that you may be an appropriate point of contact with regard to Stanford's hopes to get NIH support for the bio-medical computation. In any event, I am anxious to write you of Stanford's plans for Life Science computing support. I do not believe we have adequately communicated about these things in the past. We recently had a most pleasant site visit by members of the ACCR. Whereas we exchanged a good many ideas concerning Stanford's current grant request, I simply don't feel we were communicating very adequately. I have the distinct impression that Stanford's second request for NIH financial support will follow the path of our request last November, Grant No. GM 10559-01. The first request was turned down, I believe, because we did not adequately demonstrate the motivating purposes behind it. Partly responsible is the fact that our own sense of mission in bringing computing to Life Sciences at Stanford grew on us during the time we were preparing our request and during the time our request was being processed by NIH. At least it is true that we now have a much more clear-cut idea concerning what the Stanford Computation Center can do to promote Life Science research on the Stanford Campus.

It would be a serious mistake to assume at the outset that a successful Life Science computation enterprise at Stanford hinges on modeling our own plans after patterns established at other institutions. I am well aware of the fact that successful computing centers exist in several medical schools around the country. We have the highest regard for some of these and, in fact, have drawn heavily on programs, advice and counsel from some while making our own plans. But at Stanford we are firmly committed to the principle that more computation can be bought per dollar through a centralized computing agency. This basic principle has numerous implications. For example, it is implicit that the

Computation Center take very seriously the computing needs of the whole community of Stanford users. It also implies that the Computation Center must pursue a vigorous program of computer education, research and service if the principle of centralized computing is to endure. In a longer range sense it implies that we must ever seek for the most satisfactory computing hardware and software to maintain adequate computing power and more-than-satisfactory computing turn-around times. We are doing these things at Stanford.

Recognizing the great need for rapid checkout of programs, we maintain as small a turn-around time as possible with the equipment we have to work with. In addition, we have under study plans for a time-sharing system involving our major computers and remote consoles for individual man-machine interactions. Because Life Science computation was envisioned as a large potential growth area at Stanford, we have planned the remote console experiments in the light of real-time computation in the laboratory environment. All of our real-time interaction and time-sharing developmental work is under the over-all cognizance of Professor John McCarthy, who is an outstanding world expert in these matters.

In regard to bringing computation to the Stanford faculty and staff, let me cite our past record. All of our staff members, the Director and Associate Director included, act both formally and informally as computing missionaries around the campus. Much of this missionary work is accomplished through personal contact, through service on computing application committees and through formal talks and lectures given about computing to various campus groups. For the past two years, we have given a week-long computation seminar to the engineering faculty. Whereas the seminar was designed primarily for Engineering Science, about six from the Life Sciences came to the seminars and participated fully in its program. Known as COMPSEF for short, it was sponsored by the Ford Foundation, and the entire Computation Center staff participated full-time during the one week of the seminar. Already planned is a similar enterprise for the bio-medical sciences to be given this coming Fall. We have found the COMPSEF series to be immensely effective. We expect the same kind of response from our Life Science computation seminar later this year.

There are some who advocate a "critical mass" theory of entering computation at the Life Sciences. In this approach one simply waits until so many researchers demand high speed computing that it takes hold all by itself. With the reservation that there may be times when this philosophy pays off, I must say that I think such a philosophy at Stanford would be disastrous.

What we hope to achieve is a satisfactory marriage at the working level between the Computation Center and the Medical School. As in many such enterprises this has been started because of the active participation of a small group of people to begin with. Dr. Keith Killam and I have invested many hours in preparation for an extensive applied computation program in the Life Sciences at Stanford. We do not have at this point a "critical mass", but we are firmly convinced that adequate support now will yield a rapid growth of computing applications beyond those areas already involved. We attempted to show our recent site visitors that even now there is a reasonably wide interest in computation among Life Science people at Stanford. This interest will certainly grow and the Computation Center can more adequately co-operate in promoting this growth if we do not have to do it "on the cuff".

Central to the notion of growth in Life Science computation is the existence of an adequate capability for inputting large data volume to the digital computer. Around this need we structured our analog-to-digital conversion requirements. In our first NIH request we asked for funds to purchase this system along with adequate personnel to make it available for data handling problems known to exist now in Stanford laboratories. We acquired the services of electronics experts from the Applied Electronics Laboratory located on the Stanford Campus. We are fortunate in being well endowed with data-gathering "know-how" from Dr. Killam and his associates. The Computation Center was and is prepared to supply a wide range of software and general computing know-how to back up its role in the data handling system. We feel that the assembled manpower to make the project succeed is more than adequate. I also feel that our intentions concerning wide use of the A-D system and of other Computation Center equipment were not fully understood by the committee evaluating our proposal.

I am most anxious to make known the full breadth of our plans for promoting Life Science computation at Stanford. We believe that our past performance in the promotion of computing has been good. The same performance will result if we can be adequately supported to promote Life Science computation. Also, we believe that to achieve sought-for goals in the general areas of on-line real-time computation during experiments requires planning, funding, and practical usage now of less ambitious schemes.

I should like very much to hear from you concerning the overall Stanford picture as regards NIH support.

Very truly yours,

R. Wade Cole
Associate Director

bc: Messrs. Forsythe
Langle
Killam